

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-170915

(43)Date of publication of application : 30.06.1997

(51)Int.Cl.

G01B 11/24

(21)Application number : 07-354574

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(22)Date of filing : 19.12.1995

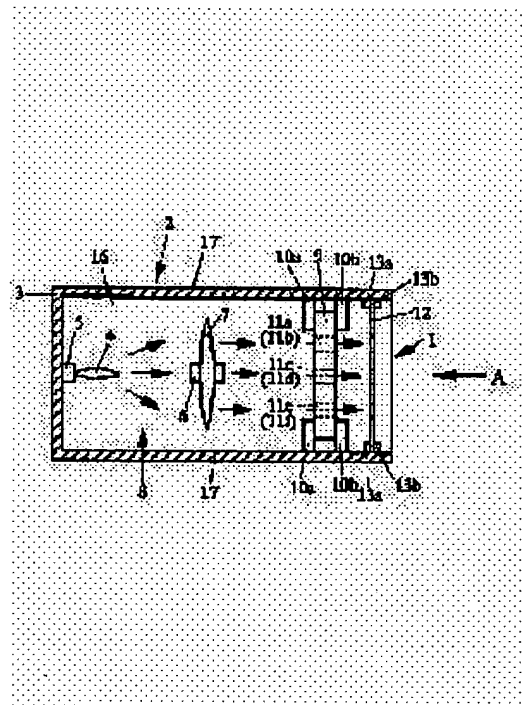
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## (54) PUNCH CHECKING DEVICE

### (57)Abstract:

PROBLEM TO BE SOLVED: To easily and rapidly inspect a punch formed on a to-be-inspected member.

SOLUTION: A light source 8 which generates parallel light with a bulb 4 and a lens 7 assigned in a box body 2 is formed. In a light path of the parallel light, a to-be-checked member 9 is so assigned that cylindrical punching surfaces of punches 11a-11f are made parallel to the parallel light above. And a translucent sheet 12 on which a punching image formed by the parallel light passing through the punches 11a-11f is projected is assigned near an opening 1 of the box body 2. Since the outline of a reference punching image formed by the parallel light passing through the punches 11a-11f of the reference to-be-checked member 9 is drawn, the punches 11a-11f are easily and rapidly inspected by comparing the outline of the reference punching image with the punching image.



## LEGAL STATUS

[Date of request for examination] 17.04.1997

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than

the examiner's decision of rejection or  
application converted registration]

[Date of final disposal for application]

[Patent number] 2873928

[Date of registration] 14.01.1999

[Number of appeal against examiner's  
decision of rejection]

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[Date of extinction of right]

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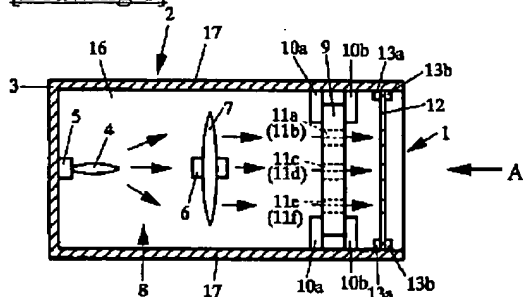
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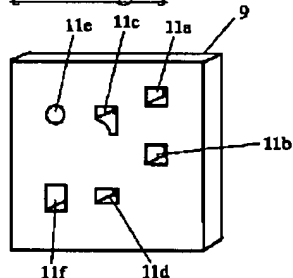
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## DRAWINGS

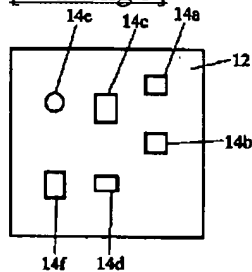
[Drawing 1]



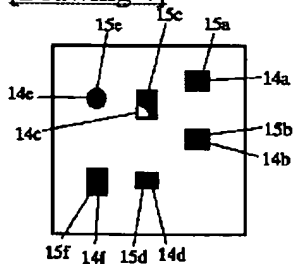
[Drawing 2]



[Drawing 3]



[Drawing 4]



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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention is used for inspection of the propriety of a cast punching condition.

[0002]

[Description of the Prior Art] Inspection with appropriate punching formed in the former, for example, a casting, was conducted by observing punching of this casting with a direct naked eye.

[0003]

[Problem(s) to be Solved by the Invention] However, in inspection by the above-mentioned conventional \*\*\*\* macro-scopic observation, the tester needs to memorize the location and configuration of punching and there was a trouble that inspection took skill. Moreover, even if it was a skillful tester, detection of a slight gap of a boring location and the slight distortion of a punching configuration had the trouble that it was difficult and inspection took long duration. Then, this invention is made in order to cancel the above-mentioned trouble, and let it be a technical problem to offer the punching test equipment which inspects punching easily and quickly.

[0004]

[Means for Solving the Problem] The punching test equipment of this invention is characterized by having the translucent sheet which displayed the profile of the light source which generates parallel light, the support which supports this inspected member so that the tubed punching side of an inspected member may become this parallel light and parallel, and the criteria punching image formed of this parallel light that passed through punching of the inspected member which becomes criteria.

[0005] Parallel light passes through punching of the inspected member which was supported by support and which should be inspected, and projects a punching image on a translucent sheet. Since the profile of the criteria punching image formed of this parallel light that passed through punching of the inspected member which becomes criteria is displayed on this translucent sheet, the existence of punching, the location of punching, and the propriety of a configuration can be inspected easily and quickly by comparing the profile of this punching image and this criteria punching image.

[0006]

[Embodiment of the Invention] As the light source which generates parallel light, the light source which combined the electric bulb and the lens may be used, and the laser light source may be used. Punching test equipment is good in the case which has opening in the location where a translucent sheet is arranged also as what arranged the light source, the support which supports an inspected member, and a translucent sheet. Although it is good also as what arranged the support which is not equipped with such a case, for example, supports the light source and an inspected member by physical relationship suitable on the examining table, and a translucent sheet, it is desirable to have had the case from a viewpoint which makes clear the punching image projected on a translucent sheet. Especially the quality of the material of a translucent sheet is not limited, but can be made the product made of resin, the product made of paper, or glass.

[0007]

[Example] Hereafter, the punching test equipment which is the example of this invention is explained based on drawing 1 -4. Opening 1 is formed in the end side of the direction of a long picture of the case 2 of the shape of a rectangular parallelepiped which equipped the top face with the lid which is not illustrated, and the electric bulb 4 connected to the power source which is not illustrated is being fixed to the wall surface 3 which counters the opening 1 of a case 2 through susceptor 5. From an electric bulb 4, it separates and is fixed to the floor line 16 by the side of the opening 1 of an electric bulb 4 so that the susceptor 6 which supports a lens 7 may have an electric bulb 4 and position relation, and the light source 8 is formed in it from the electric bulb 4 and the lens 7. The physical relationship of an electric bulb 4 and a lens 7 changes with configurations of a lens 7 etc., and after the light emitted from the electric bulb 4 penetrating a lens 7, it is adjusted so that it may become a parallel light parallel to the direction of a long picture of a case 2.

[0008] The support 10a and 10b which supports the inspected member 9 is fixed from the light source 8 in the optical path of the parallel light emitted from the light source 8 by the floor line 16 by the side of opening 1. Carry out distance alienation and it is arranged. support 10a and support 10b are slightly bigger than the thickness of the inspected member 9 along with the wall surface 17 of a case 2 -- As shown in drawing 2, two or more punching 11a-11f is formed in the inspected member 9, and the inspected member 9 is supported by support 10a and support 10b so that the tubed punching side which are Punching 11a-11f may become parallel light and parallel.

[0009] As a defect who is a casting and arises to Punching 11a-11f, although the inspected member 9 has generating of weld flash, deformation of punching, lock out of punching, etc., it explains to an example the case where a part of punching deforms, in this example. As shown in drawing 2, punching 11c which should be a rectangular parallelepiped deforms the inspected member 9.

[0010] The support 13a and 13b which supports the translucent sheet 12 is fixed to the about one opening [ ahead of an parallel Mitsuyuki line writing direction ] floor line 16 from the inspected member 9. Along with the wall surface 17 of a case 2, as for support 13a and support 13b, the punching image formed of a slightly bigger parallel light which was stretched so that distance alienation might be carried out, it might be arranged and the translucent sheet 12 might intersect perpendicularly to parallel light between the supporter material 13a and 13b, and passed through Punching 11a-11f than the thickness of the inspected member 9 is projected on the translucent sheet 12.

[0011] As shown in drawing 3, the profiles 14a-14f of the criteria punching image formed of the parallel light which passed through the punching 11a-11f of the inspected member 9 which becomes criteria are displayed on the translucent sheet 12.

[0012] Next, an operation of this example is explained. A lid (not shown) is closed and a measurement setup is completed, after inserting the inspected member 9 between support 10a and support 10b from the upper part of a case 2, where the lid (not shown) of a case 2 is opened. If power is supplied to an electric bulb 4 from a power source (not shown), the parallel light emitted from the light source 8 which an electric bulb 4 emits light, and parallel light is formed with a lens 7, and is formed from an electric bulb 4 and a lens 7 will pass through the punching 11a-11f of the inspected member 9, and as shown in drawing 4, the punching images 15a-15f corresponding to Punching 11a-11f will be projected on the translucent sheet 12. If the profiles 14a-14f of a criteria punching image are displayed on the translucent sheet 12 and the profiles 14a-14f of the punching images 15a-15f and a criteria punching image are compared, since punching 11c will deform, Although a punching images [ 15a, 15b, 15e, and 15f ] profile and the profiles 14a, 14b, 14e, and 14f of a criteria punching image are in agreement, the profile of punching image 15c and its profile 14c of a criteria punching image do not correspond. Therefore, it can judge easily [ that the configuration of punching 11c is unusual ], and quickly.

[0013]

[Effect of the Invention] Since punching of an inspected member can be inspected easily and quickly, while according to this invention inspection precision and a patient throughput become high and inspection time amount is shortened, the dependability of a product improves.

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CLAIMS

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[Claim(s)]

[Claim 1] Punching test equipment characterized by having the translucent sheet which displayed the profile of the light source which generates parallel light, the support which supports this inspected member so that the tubed punching side of an inspected member may become this parallel light and parallel, and the criteria punching image formed of this parallel light that passed through punching of the inspected member which becomes criteria.

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